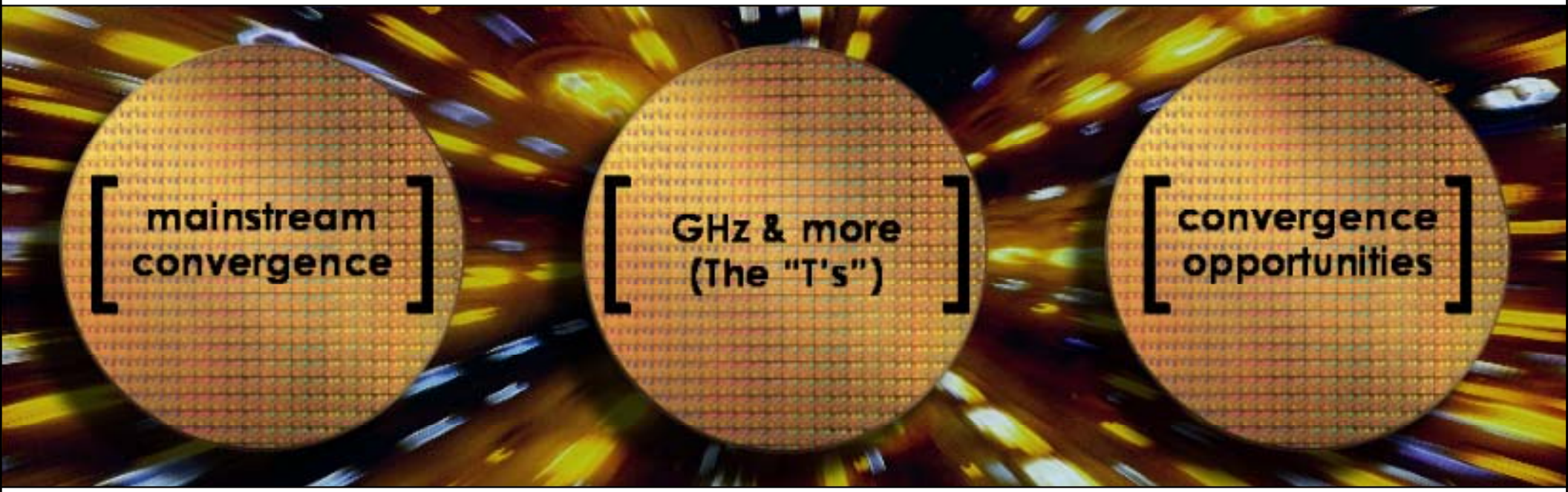
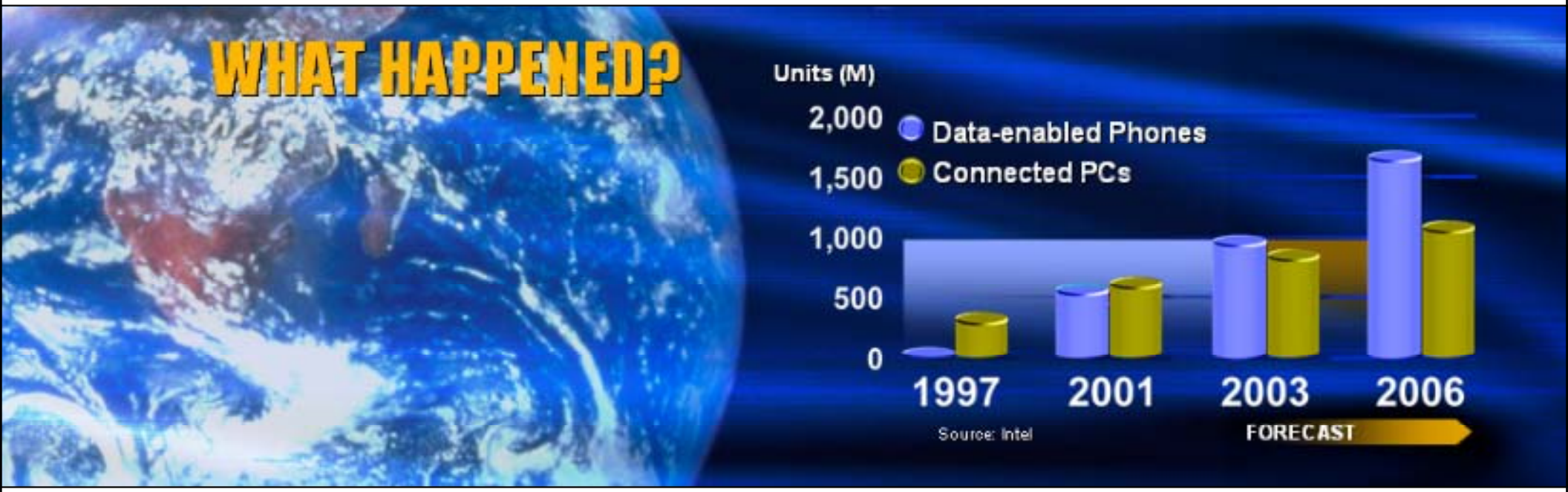

INTEL DEVELOPER FORUM
PAUL S. OTELLINI
PRESIDENT & CHIEF OPERATING OFFICER
intel
intel inside
intel inside
centrino
MOBILE TECHNOLOGY
intel inside
ITANIUM 2
XEON


[mainstream convergence]
[GHz & more (The "T's")]
[convergence opportunities]


[7 years ago]
1 Billion Connected Computers
–Andy Grove
[4 years ago]
1 Billion Connected Computers
1 Billion Connected Handsets
–Craig Barrett


WHAT HAPPENED?
Units (M)
2,000
1,500
1,000
500
0
Data-enabled Phones
Connected PCs
1997
2001
2003
2006
Source: Intel
FORECAST


2010 – More Broadband PCs, More Powerful Handsets
1.5 Billion Broadband PCs –
Wired & Wireless
2.5 Billion Connected Handsets –
with "Today's PC inside"
[future]

2010 – Geographical Market Changes

[China]

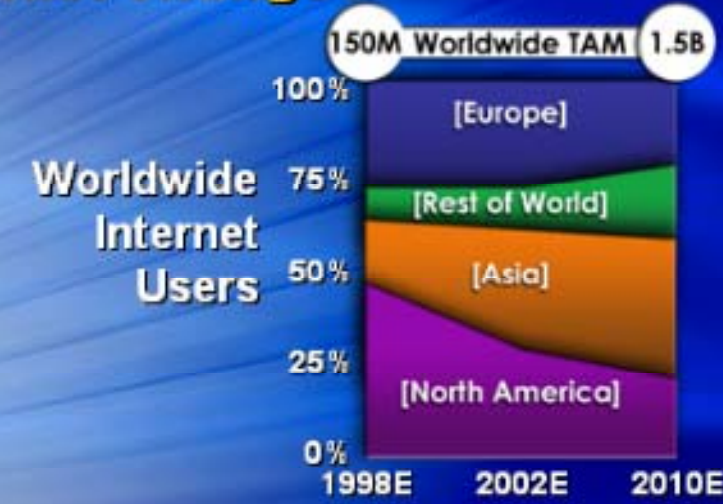
[today]

#1 telephone lines
#1 mobile phones
#1 cable TV
#4 installed PCs

[2010]

#1 PC Market

Source: Morgan Stanley Research (Edleistone, Meeker) 2003




All computers will communicate
[convergence]
All communications devices will compute

2003 – Intel Brings Convergence Mainstream



Manitoba
"Wireless Internet on a Chip"

the
[convergence]
surge



Intel® Centrino™
Mobile Technology

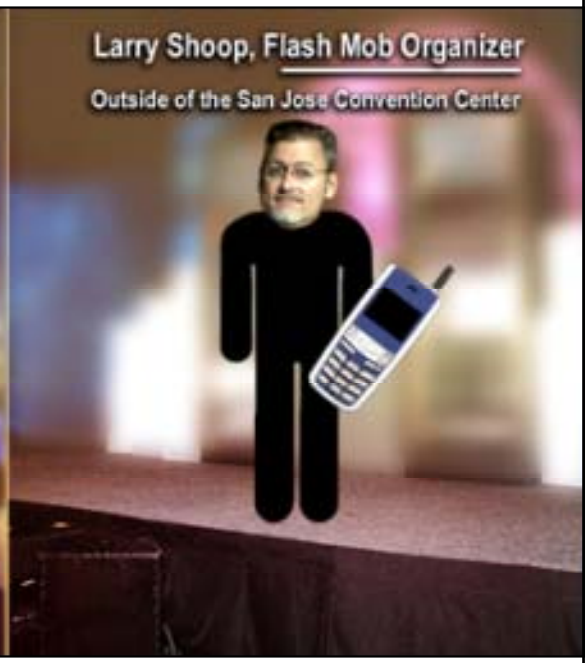



Universal Communicator
SAN JOSE MCENERY CONVENTION CENTER


Universal Communicator
Combining Strengths
CONVENTION CENTER


Universal Communicator


Paul S. Otellini
Right in Front of You


Larry Shoop, Flash Mob Organizer
Outside of the San Jose Convention Center


Universal Communicator
Paul S. Otellini
Right in Front of You
GSM
Larry Shoop, Flash Mob Organizer
Outside of the San Jose Convention Center


Universal Communicator
Paul S. Otellini
Right in Front of You
Larry Shoop, Flash Mob Organizer
Outside of the San Jose Convention Center
GSM
802.11b


Universal Communicator
Paul S. Otellini
Right in Front of You
GSM
802.11b
Larry Shoop, Flash Mob Organizer
Outside of the San Jose Convention Center


Universal Communicator
VAIO


Universal Communicator
FLASH MOB COUNTDOWN
T-MINUS
0:45


Wireless Takes Flight
[unwire]

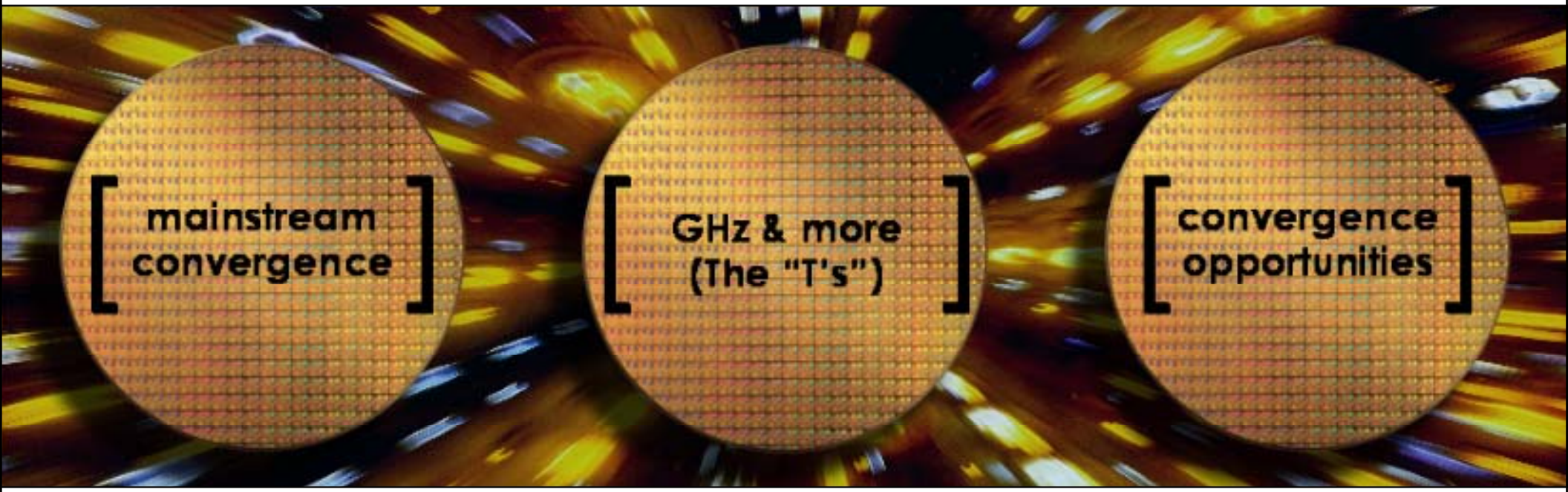

Wireless Access Point
Installed Base
12,704,742
Wireless NIC
Installed Base
43,083,760
Source: In-Stat


Wireless Takes Flight
[unwire]


Our Wireless Direction...
[WLAN]
802.11
Single to multi-band
(& low power)
[WMAN]
802.16
Production in '04
[WWAN]
GSM/GPRS
Extending to EDGE in '04
then WCDMA


[WLAN]
[WMAN]
[WWAN]


[convergence]


[mainstream convergence]
[GHz & more (The "T's")]
[convergence opportunities]


4 Industry Shaping Technologies
GIANT's"
Hyper-
Threading
Technology
Intel® Centrino™
Mobile Technology
LaGrande
Technology
Vanderpool
Technology

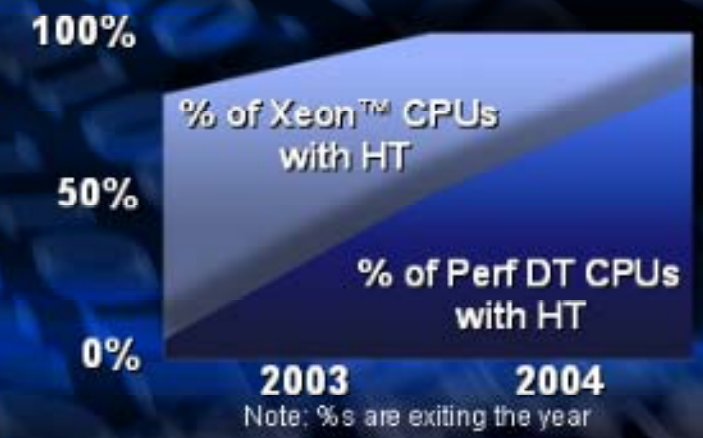

From Fall IDF 2001
Moving Beyond GHz
Paul Otellini
Executive Vice President
Intel Architecture Group
intel
Making These Happen Requires a Change In Our Collective Investment Pattern
Was:
How to deliver 1 more MHz
Will be:
How to deliver a substantially better computing experience
Moving Beyond GHz
"Compute Experience"
Hyper-Threading
Itanium Architecture

The First "T": Hyper-Threading Technology

Rapid Adoption of "Performance through Parallelism"

Announced: Fall '01

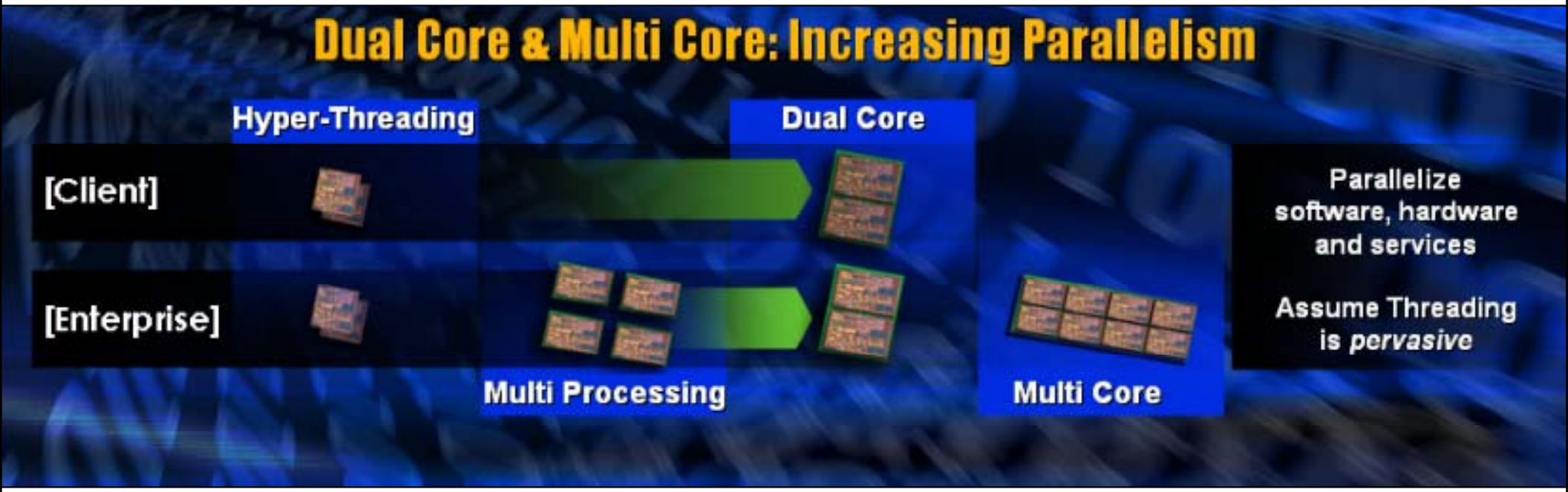
Intro'd: Nov. '02



Note: %s are exiting the year

The "HT's"

Hyper-Threading Technology

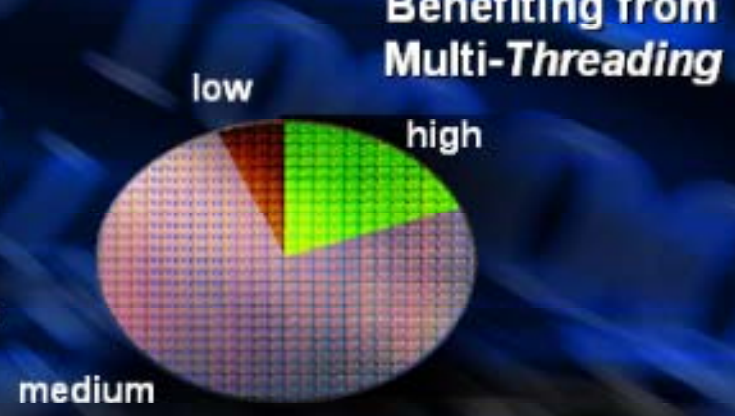

Dual Core & Multi Core: Increasing Parallelism
Hyper-Threading
Dual Core
[Client]
[Enterprise]
Multi Processing
Multi Core
Parallelize software, hardware and services
Assume Threading is pervasive

Threading Matters

>100 client apps threaded

Music, Video, Photos, Games, Productivity…





Note: Base of ~1000 apps


Our Mobile "T": CMT
[mobile technology]
intel inside
centrino
MOBILE
TECHNOLOGY

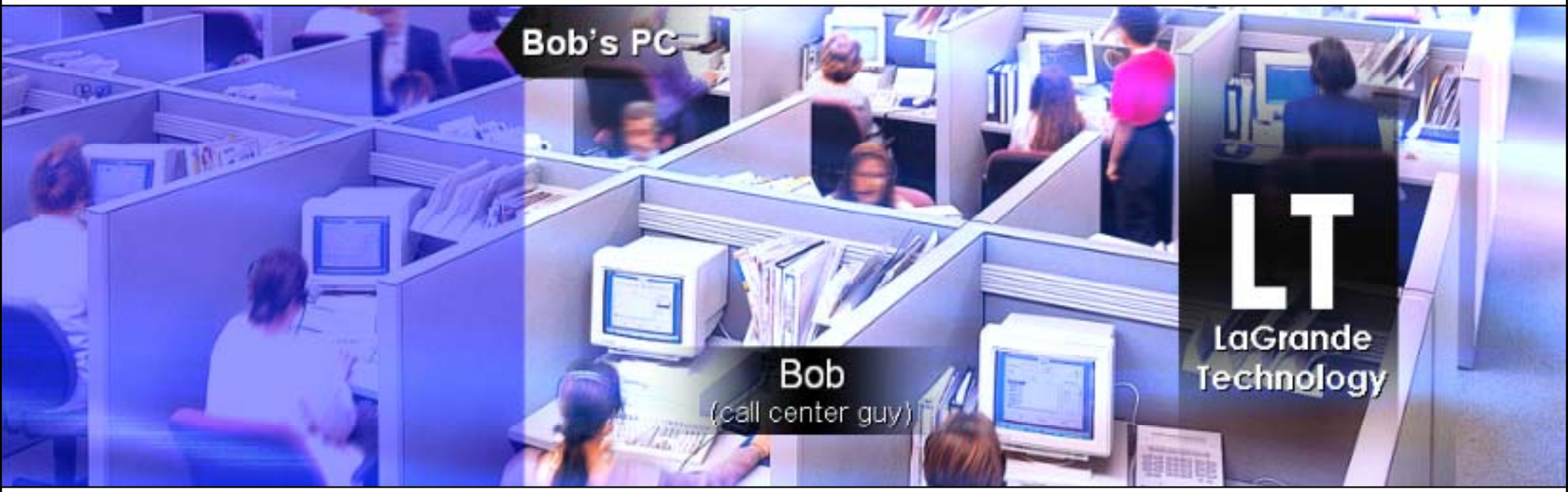

The Next "T"...
[security]
Enhanced Security
The "T's"
LaGrande
Technology


[security]


[security]


USA TODAY
Archives
Nominate a teacher for the All-USA Teacher Team
CENTRAL
SUNGARD
DELL
CNN.com/TECHNOLOGY
CNN.com / SCI-TECH
NEWS


DELL
Archives
SUNGARD
CNN.com/TECHNOLOGY
CNN.com / SCI-TECH


Bob's PC
Bob
(call center guy)
LT
LaGrande
Technology


Bob's PC
Hacker
Bob
(call center guy)


Without LaGrande Protection
Bob's PC
Hacker's PC
Hacker captures Bob's username and password (bluefinger) with key logger
Keystroke Capture


Without LaGrande Protection
Bob's PC
Hacker's PC
Hacker sees Larry's credit card # using a graphics frame buffer dump and, other customer names (e.g., David Blex)
Graphics Frame Buffer Scan


Without LaGrande Protection
Bob's PC
Hacker's PC
Remote memory dump reveals credit card numbers of pending orders not visible on screen (e.g., David Blex 6543-9876-0123-9870)
System Memory Scan


[security]
Enhanced Security
LT
LaGrande
Technology


With LaGrande Protection
Bob's PC
Hacker's PC
Prevents hacker from capturing username or password with a key logger
Protected Input


With LaGrande Protection
Bob's PC
Hacker's PC
Safeguards credit card information displayed on screen.
Protected Graphics


With LaGrande Protection
Bob's PC
Hacker's PC
Credit card numbers of pending orders in protected memory not visible in hacker's remote memory dump (e.g., David Blex 9FEL92.F.F.M... T.6)
Protected Memory


[security]
LT
LaGrande
Technology


LaGrande Technology (LT): Working with Industry Leaders...
[security]
Enhancements to Intel Si
Enhances security
Privacy and user choice
Opportunity for innovation
Microsoft
FUJITSU
NEC
FUJITSU SIEMENS
IBM
lenovo


LaGrande Technology (LT): Working with Industry Leaders...
Enhancements to Intel Si
Enhances security
Privacy and user choice
Opportunity for innovation
[security]
Microsoft
FUJITSU
NEC
FUJITSU SIEMENS
IBM
lenovo


Living Room TV
Home Office PC


Play@TV
Digital Media Adapter
Living Room TV
Home Office PC


Living Room TV
Home Office PC

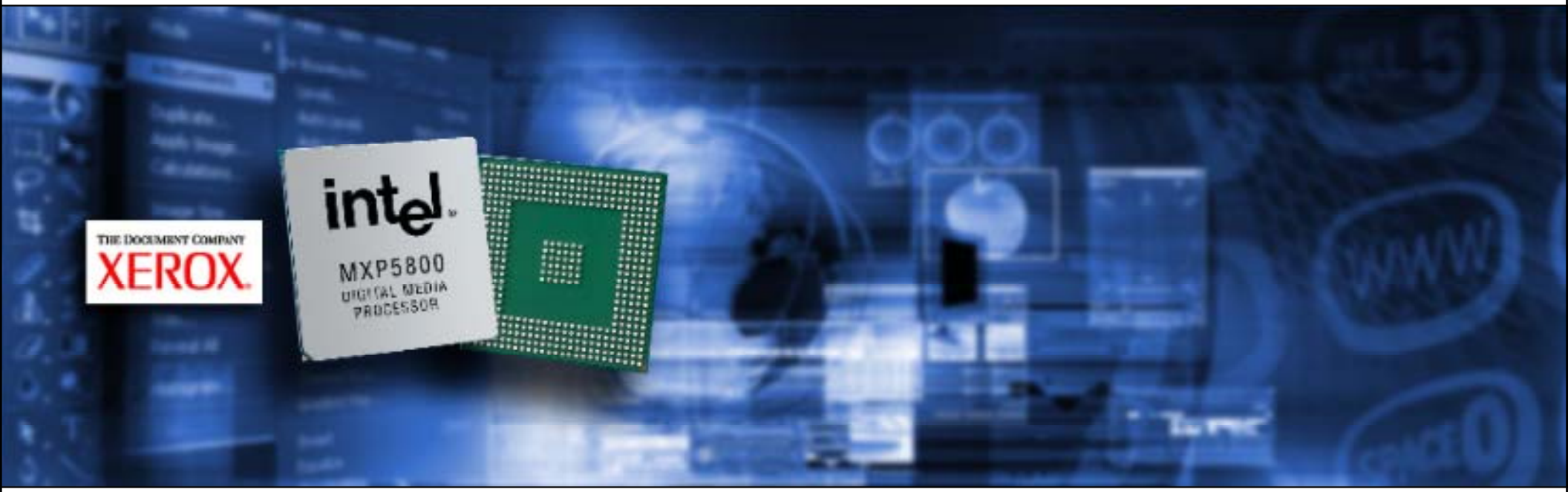

VT Enabled PC
Via DMA Partition 1
VT Enabled
PC Partition 2

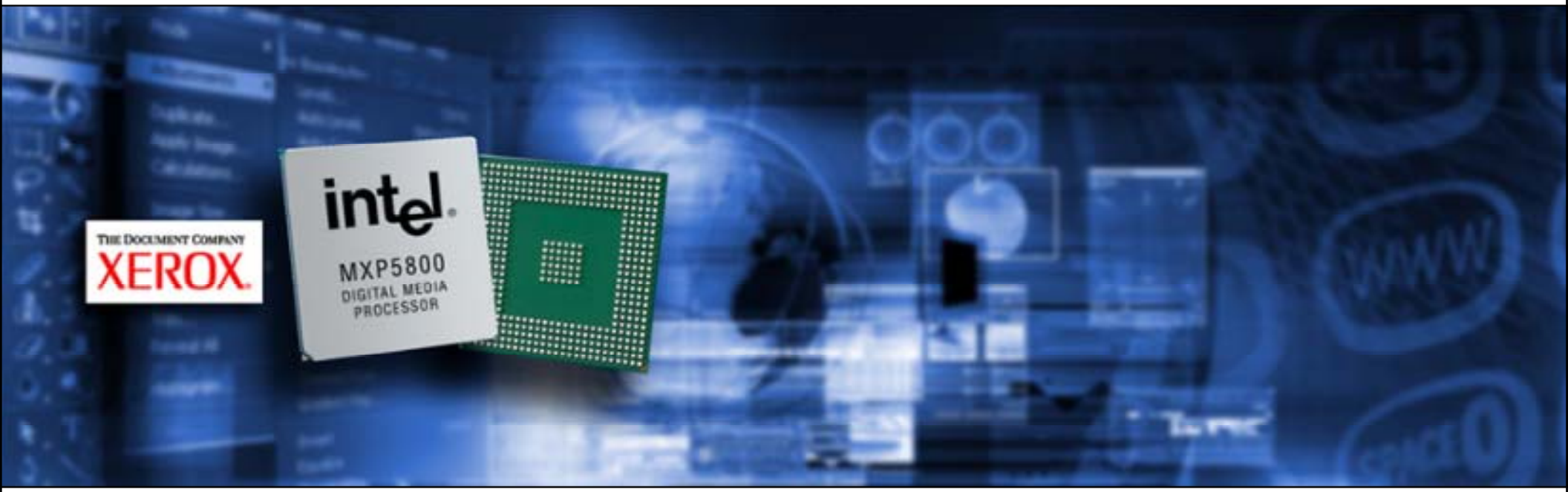

Vanderpool Technology (VT)
1st hardware virtualization support for IA-32
Multiple, independent software environments
Improves system resilience & reliability
PERSONAL VIDEO STATION
Web Admin


What's Next?
[Media and Graphics]
Intersecting the Media Revolution
Mode
Adjustments
Duplicate...
Apply Image...
Calculations...
Image Size...
Canvas Size...
Rotate Canvas
Crop
Trim...
Reveal All
Histogram...
Levels...
Auto Levels
Auto Contrast
Auto Color
Curves...
Color Balance...
Brightness/Contrast...
Hue/Saturation...
Desaturate
Replace Color...
Selective Color...
Channel Mixer...
Gradient Map...
Invert
Equalize
WWW
SPACE

[The Explosion In Digital Media]

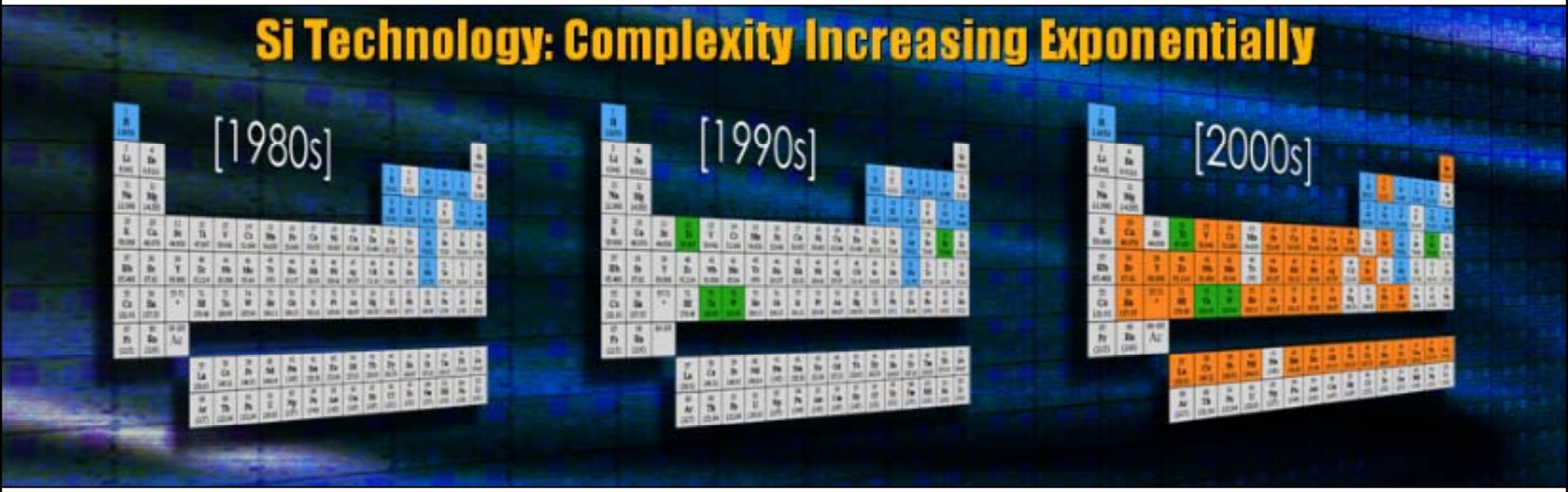

Media History: Innovate & Integrate
Intel
MMX™
1995
SSE
SSE2
2003
WWW

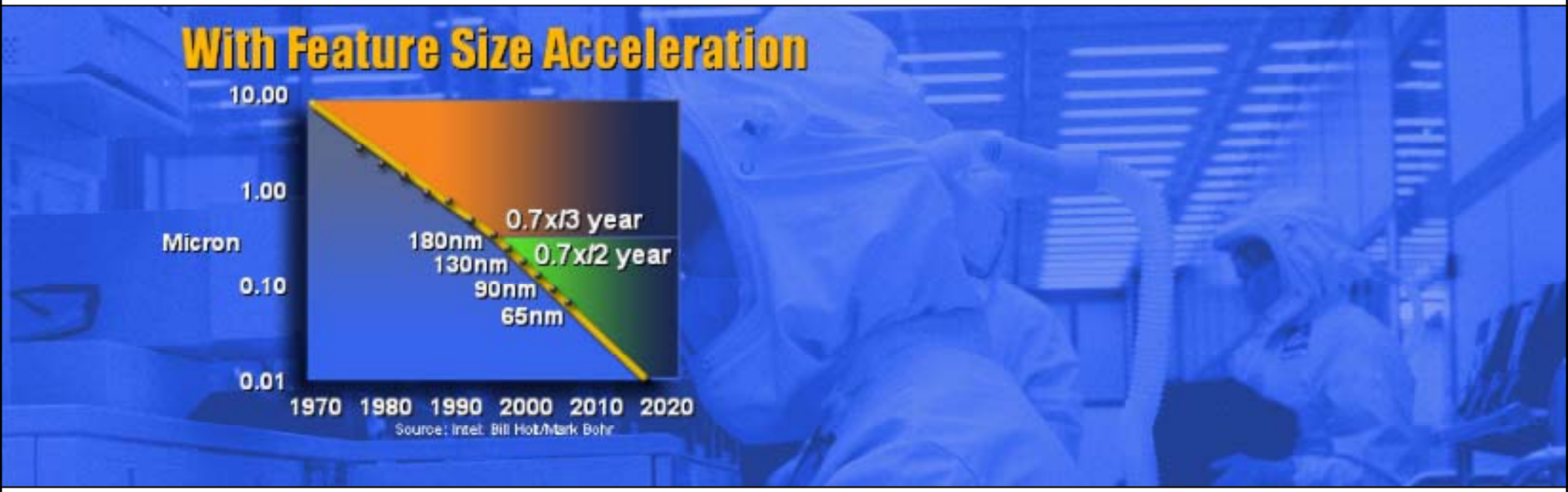

THE DOCUMENT COMPANY
XEROX
intel
MXP5800
DIGITAL MEDIA
PROCESSOR

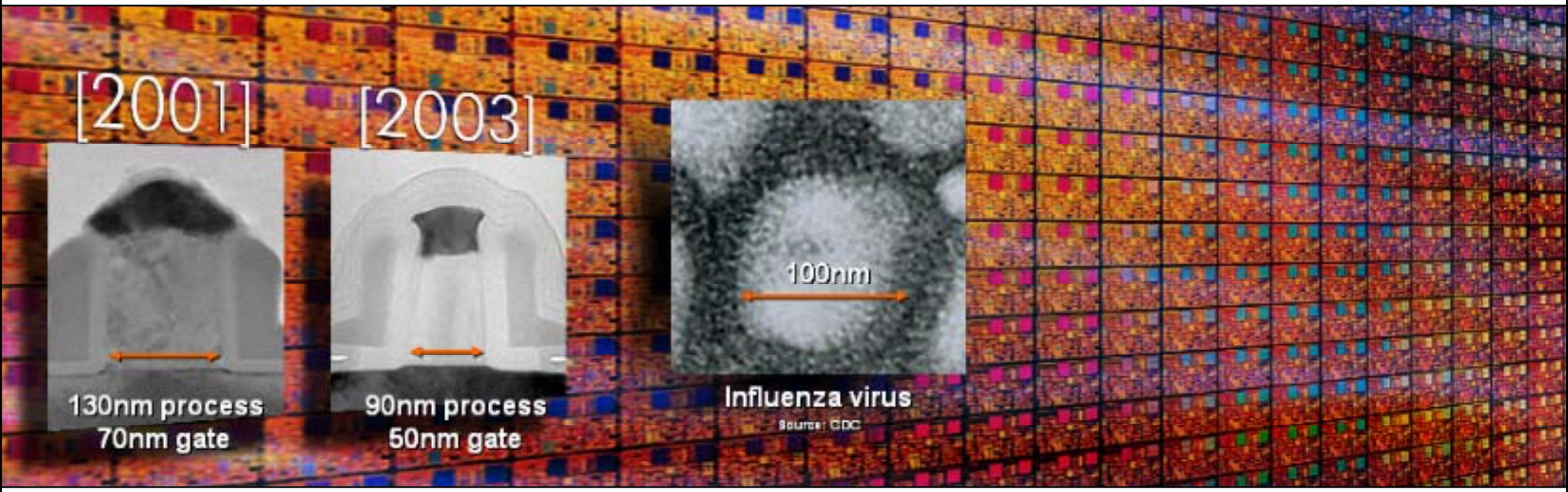

THE DOCUMENT COMPANY
XEROX
intel
MXP5800
DIGITAL MEDIA
PROCESSOR

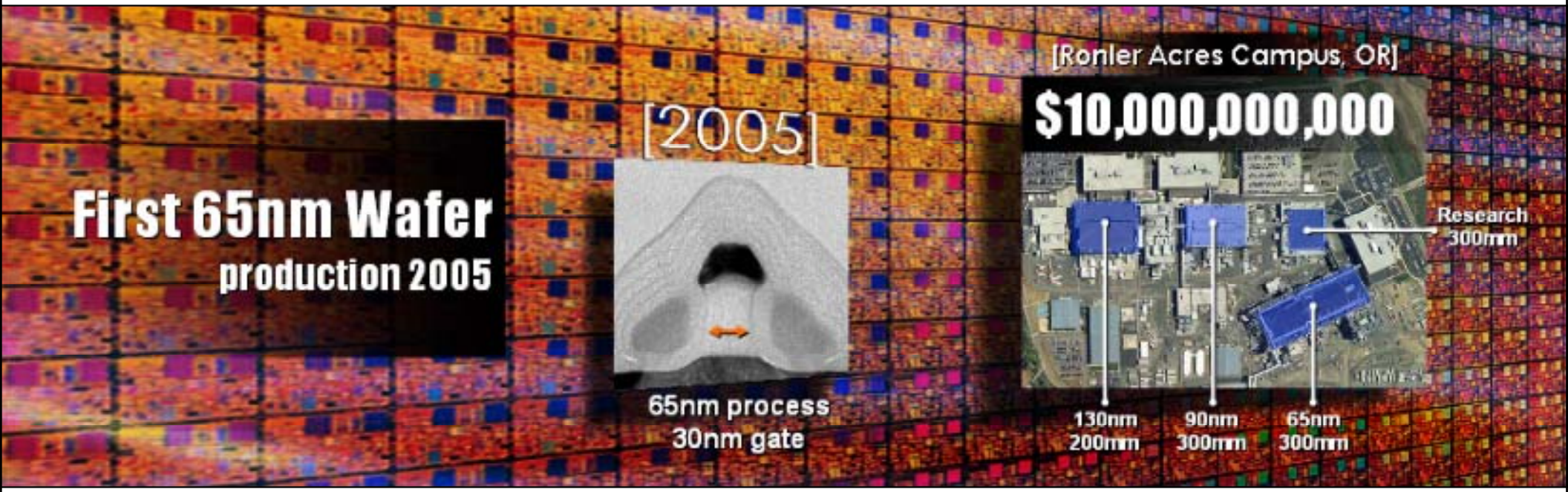

The Worlds Best "Diffusion Engine"
% of Intel Client Silicon with New Capabilities
100%
80%
60%
40%
20%
0%
PCI
USB
AC'97
LAN
USB2
HT
PCI-Express
Wi-Fi
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Source: Intel chipset volume data as of May'03
Square wave markets = New product opportunities

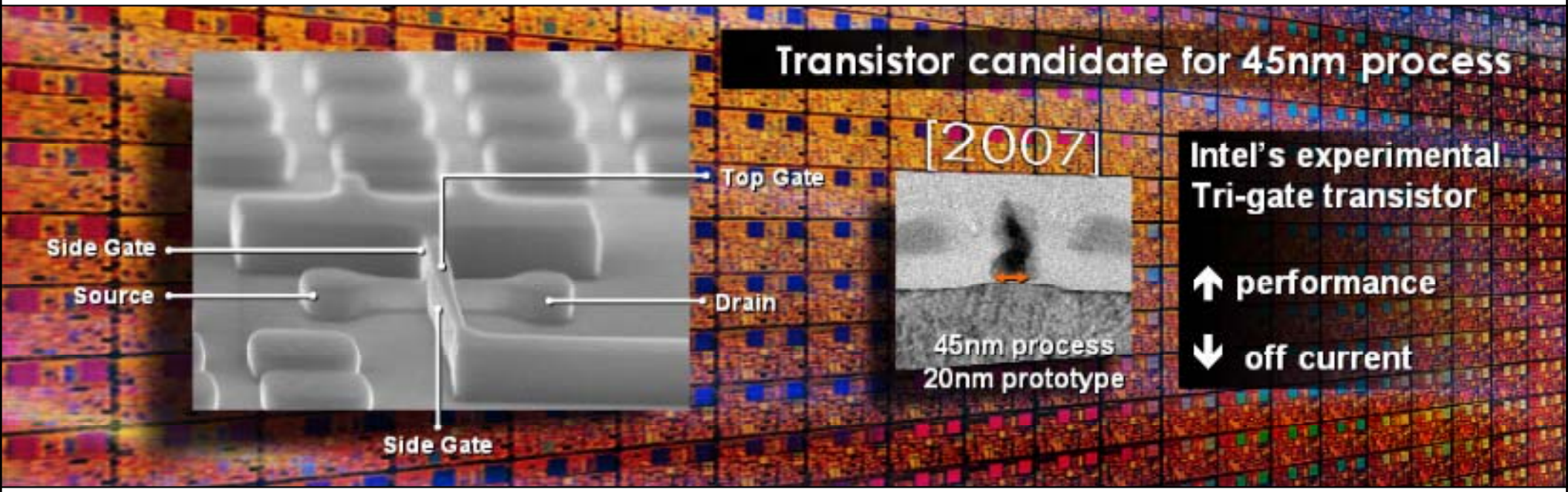

The Foundation "T"
[silicon technology]

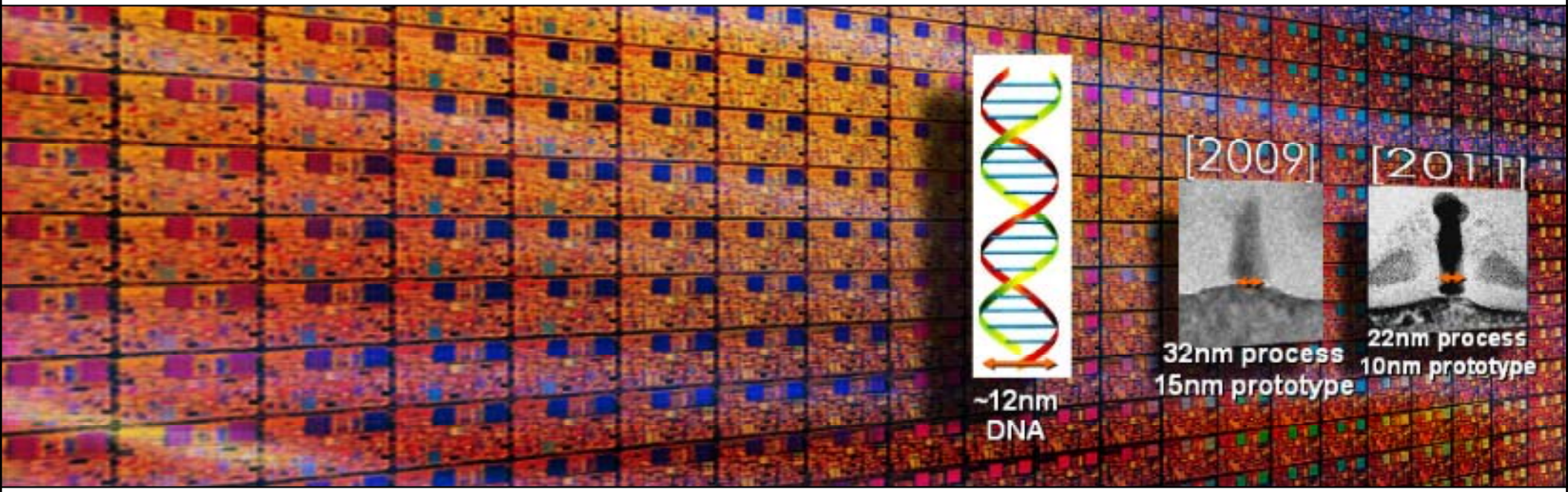

Si Technology: Complexity Increasing Exponentially
[1980s]
[1990s]
[2000s]

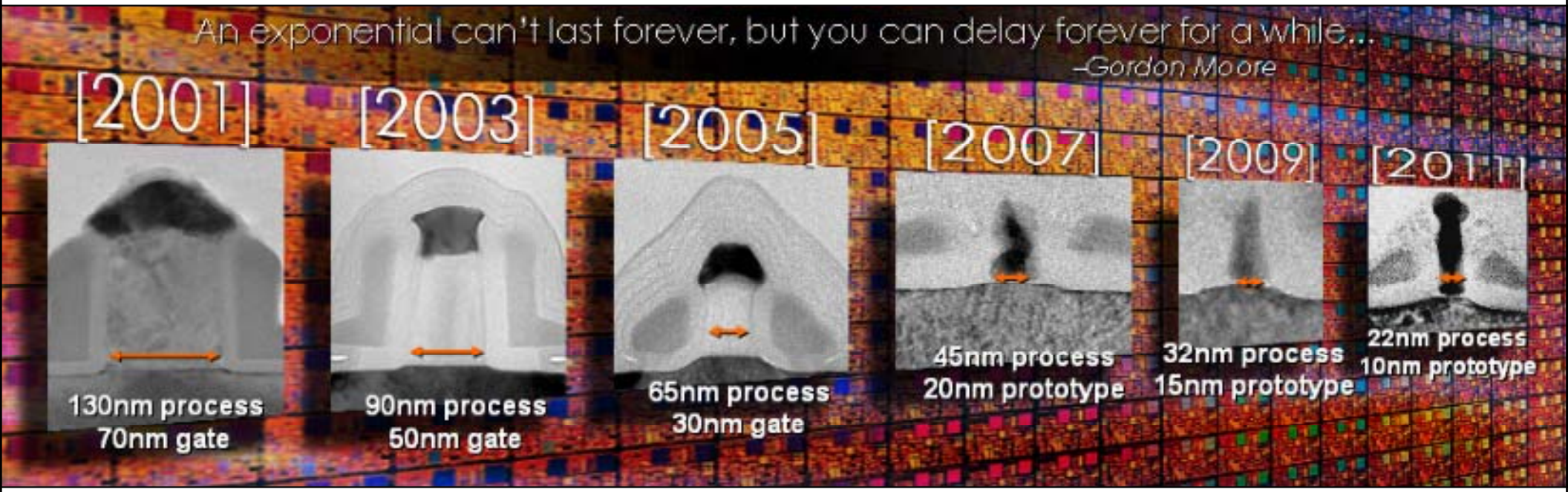

With Feature Size Acceleration
10.00
1.00
0.10
0.01
Micron
0.7x/3 year
0.7x/2 year
180nm
130nm
90nm
65nm
1970 1980 1990 2000 2010 2020
Source: Intel: Bill Holt/Mark Bohr

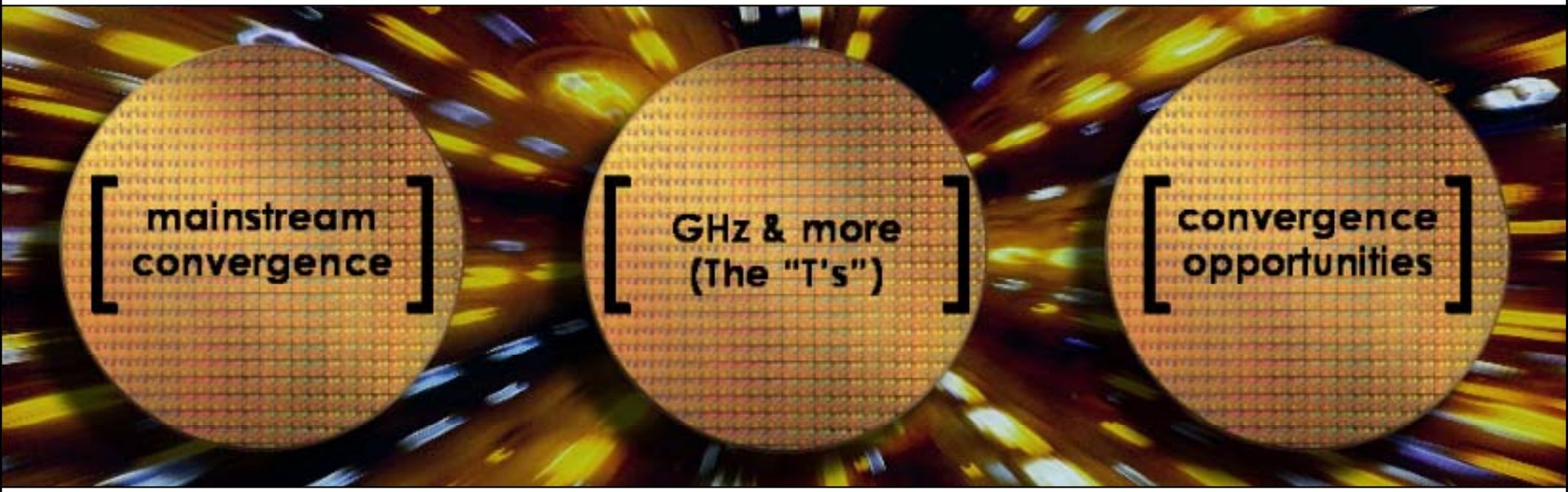

[2001]
[2003]
130nm process
70nm gate
90nm process
50nm gate
100nm
Influenza virus
Source: CDC


First 65nm Wafer
production 2005
[2005]
65nm process
30nm gate
[Ronler Acres Campus, OR]
$10,000,000,000
Research
300mm
130nm
200mm
90nm
300mm
65nm
300mm


Transistor candidate for 45nm process
[2007]
Intel's experimental
Tri-gate transistor
performance
off current
Top Gate
Side Gate
Source
Drain
Side Gate
45nm process
20nm prototype


~12nm
DNA
[2009]
32nm process
15nm prototype
[2011]
22nm process
10nm prototype

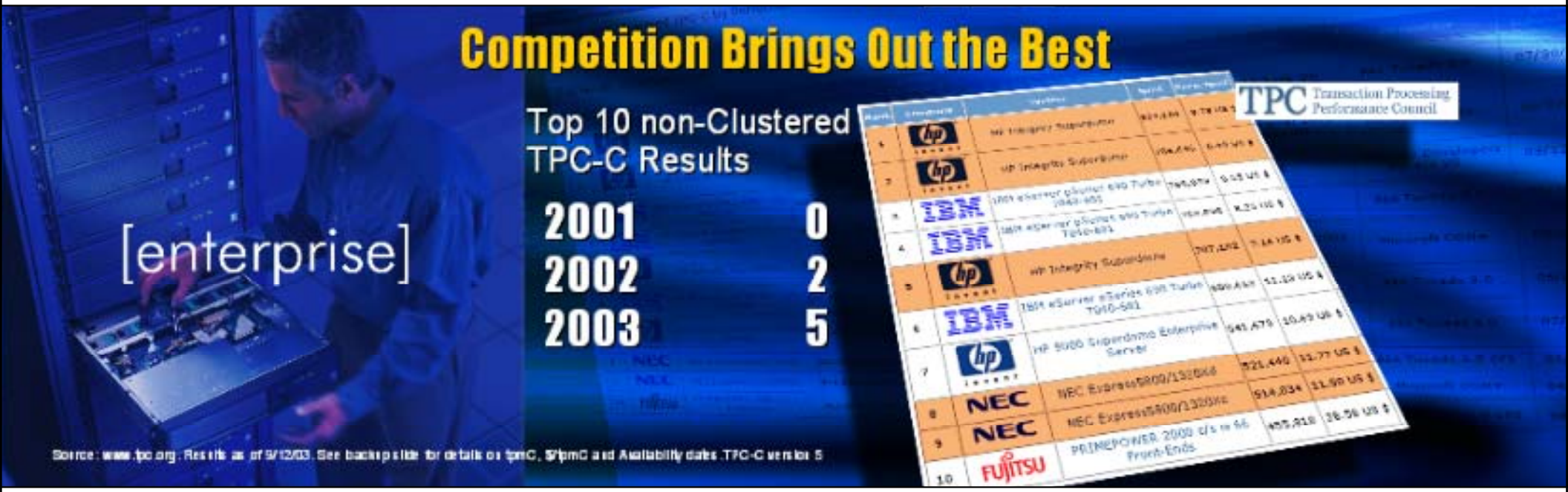

An exponential can't last forever, but you can delay forever for a while...
–Gordon Moore
[2001]
[2003]
[2005]
[2007]
[2009]
[2011]
130nm process
70nm gate
90nm process
50nm gate
65nm process
30nm gate
45nm process
20nm prototype
32nm process
15nm prototype
22nm process
10nm prototype

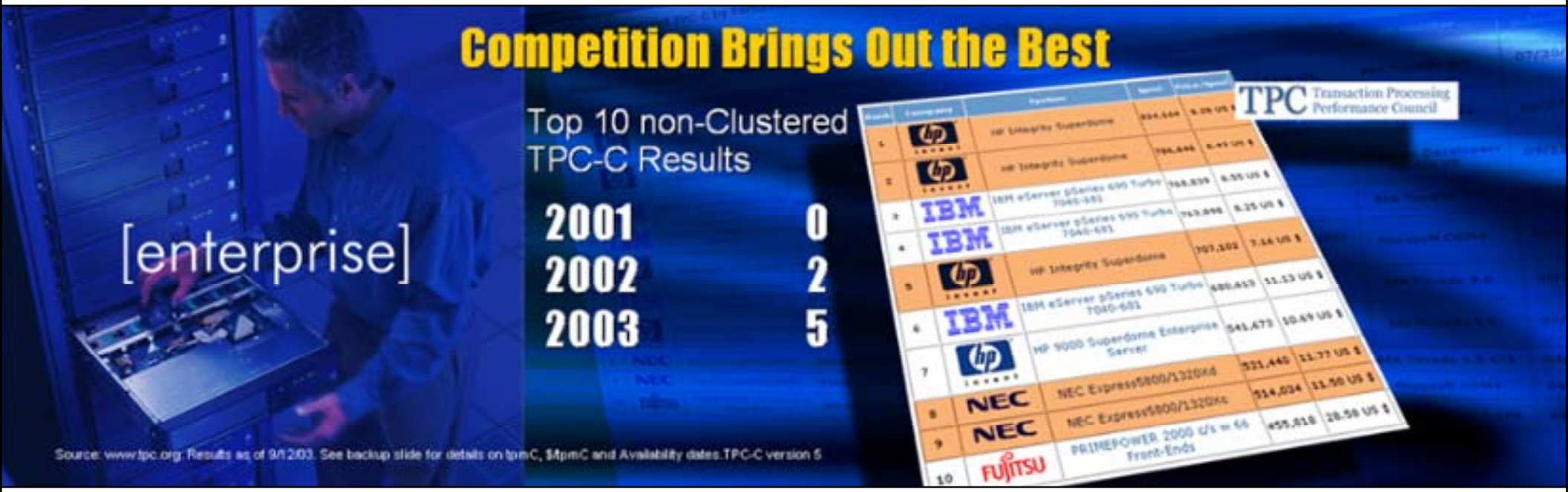

[mainstream convergence]
[GHz & more (The "T's")]
[convergence opportunities]


[enterprise]
[mobile]
[home]

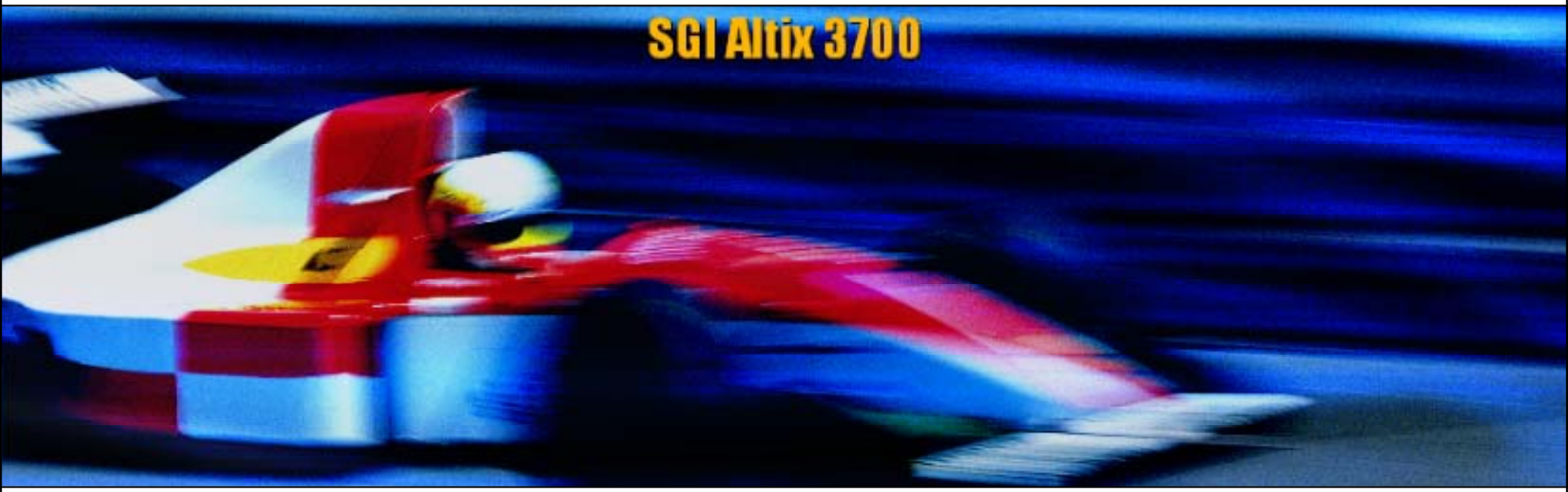

Wireless: The Next Server Opportunity
Internet : Edge
Wireless : Databases & mobile apps
[enterprise]
[wireless]
Architect the enterprise for wireless
Software – Hardware – Services


[enterprise]
Competition Brings Out the Best
tpmC
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Non-clustered
Best RISC tpmC
Best IA tpmC
4/23 514K
5/20 707K
5/19 681K
6/30 763K
7/30 824K
2001
2002
2003


Competition Brings Out the Best
[enterprise]
Top 10 non-Clustered
TPC-C Results
2001 0
2002 2
2003 5
TPC Transaction Processing Performance Council
Source: www.tpc.org, Results as of 9/12/03. See backup slide for details on tpmC, $/tpmC and Availability dates. TPC-C version 5

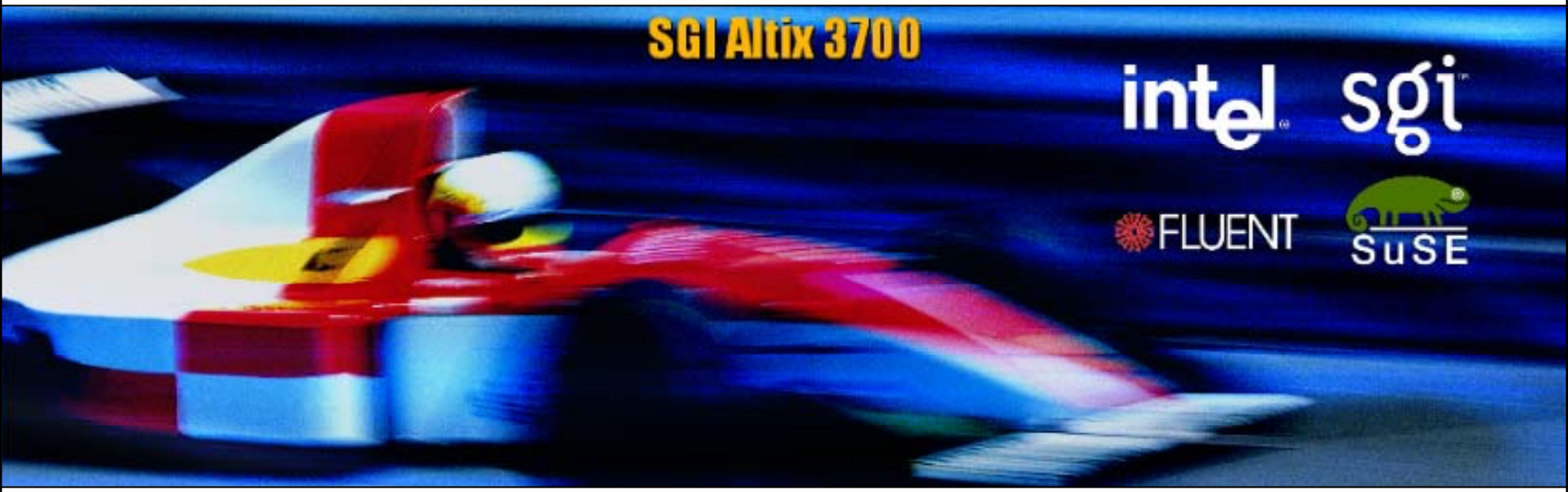

Competition Brings Out the Best
[enterprise]
Top 10 non-Clustered
TPC-C Results
2001 0
2002 2
2003 5
TPC Transaction Processing Performance Council
Source: www.tpc.org: Results as of 9/1/2003. See backup slide for details on tpmC, $/tpmC and Availability dates.TPC-C version 5

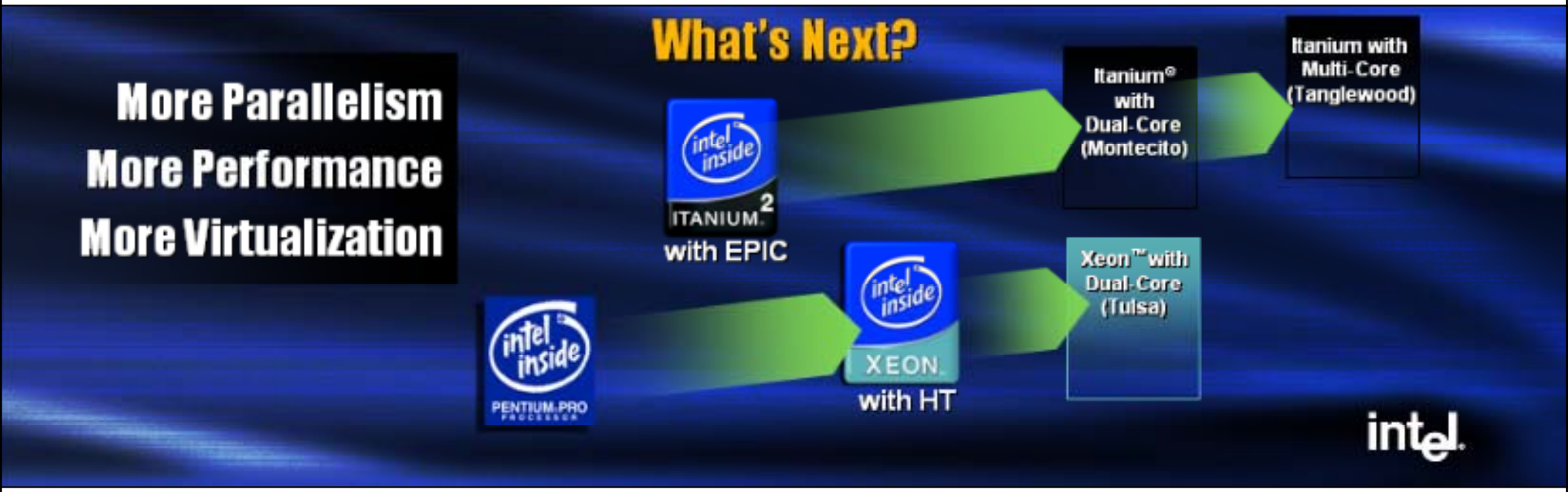

SGI Altix 3700
Most scalable
Itanium® 2
First time Linux scaled
to 128 processors


SGI Altix 3700


SGI Altix 3700
intel
sgi
FLUENT




SGI Altix 3700
intel
sgi
FLUENT
SuSE


What's Next?
More Parallelism
More Performance
More Virtualization
intel inside
ITANIUM 2
with EPIC
Itanium®
with
Dual-Core
(Montecito)
Itanium with
Multi-Core
(Tanglewood)
intel inside
PENTIUM-PRO
intel inside
XEON
with HT
Xeon™ with
Dual-Core
(Tulsa)
intel

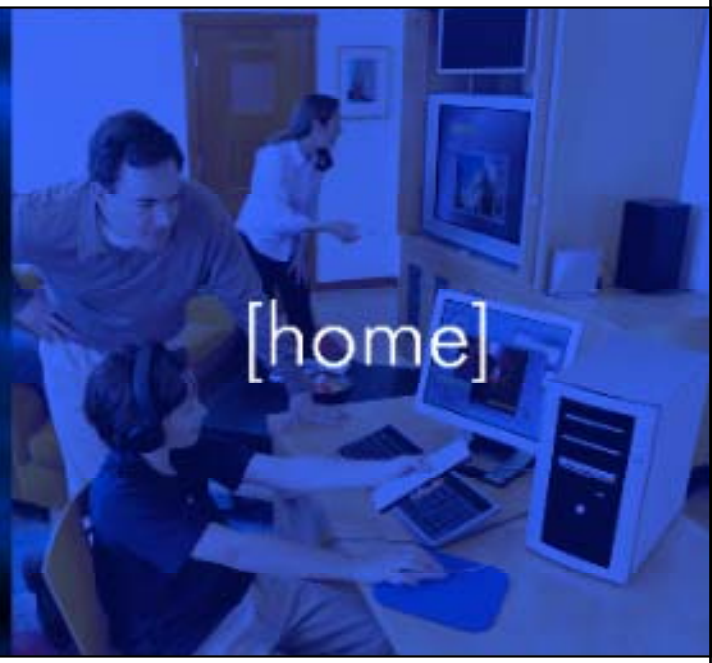

[mobile]


Intel's Cross Architecture Vision
All Software Must "Get Mobilized"
[enterprise]
[mobile]
[home]
Apps Spanning Connectivity Levels
Software Architecture & Tools: Driving New Hardware Innovation

" In 10 years of writing about personal technology, I have heard the digital home heralded so often that it has seemed as mythical as the unicorn.

Still, I'm convinced that it is on the verge of becoming reality."

Business Week, 7/21/2003




Digital Home
Digital Home Work Group announced with 17 companies
Digital Home Guidelines Rev 1.0: 1H'04
First Products: 2004
[home]

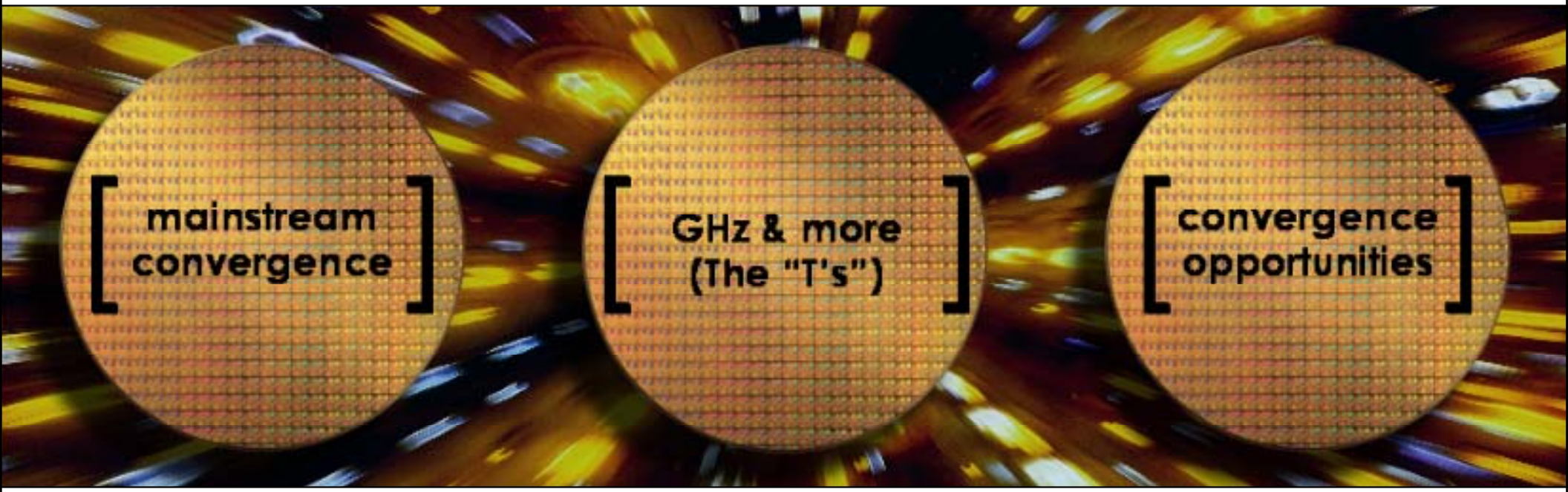

Digital Home
Digital Home Work Group announced with 17 companies
Digital Home Guidelines Rev 1.0: 1H'04
First Products: 2004
[home]


Home Office PC
Living Room TV
Digital Transmission
Content Protection
over IP (DTCP-IP)

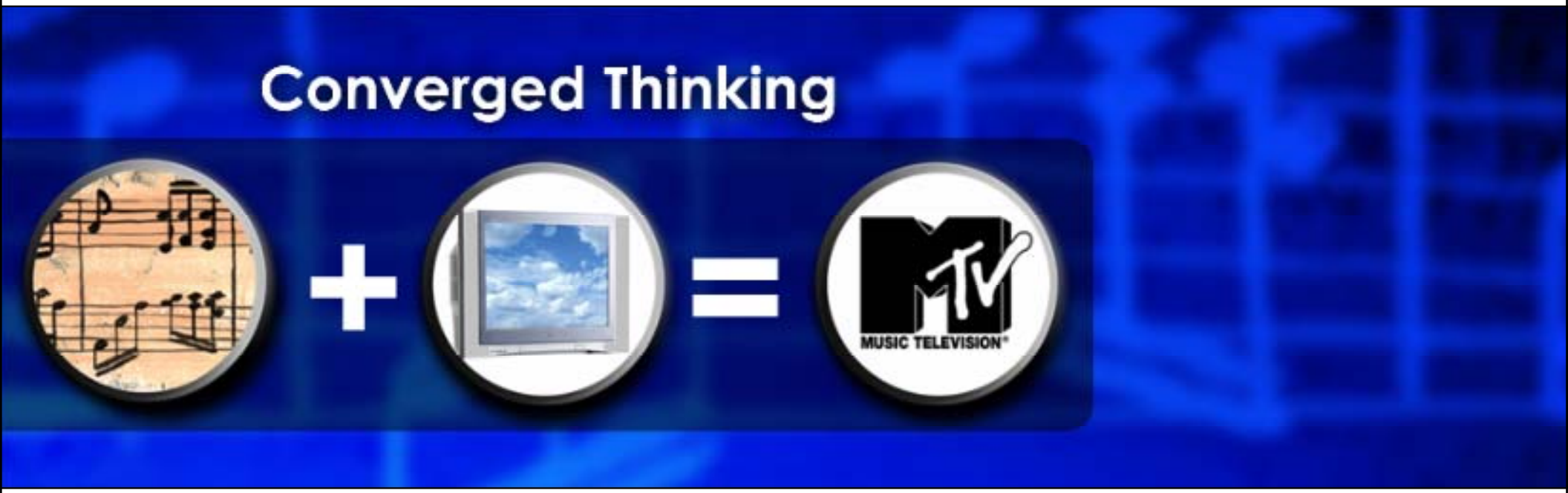

HOLLYWOOD
WARNER BROS. STUDIOS


HOLLYWOOD


SAN JOSE MCENERY CONVENTION CENTER


[mainstream convergence]
[GHz & more (The "T's")]
[convergence opportunities]

Converged Thinking

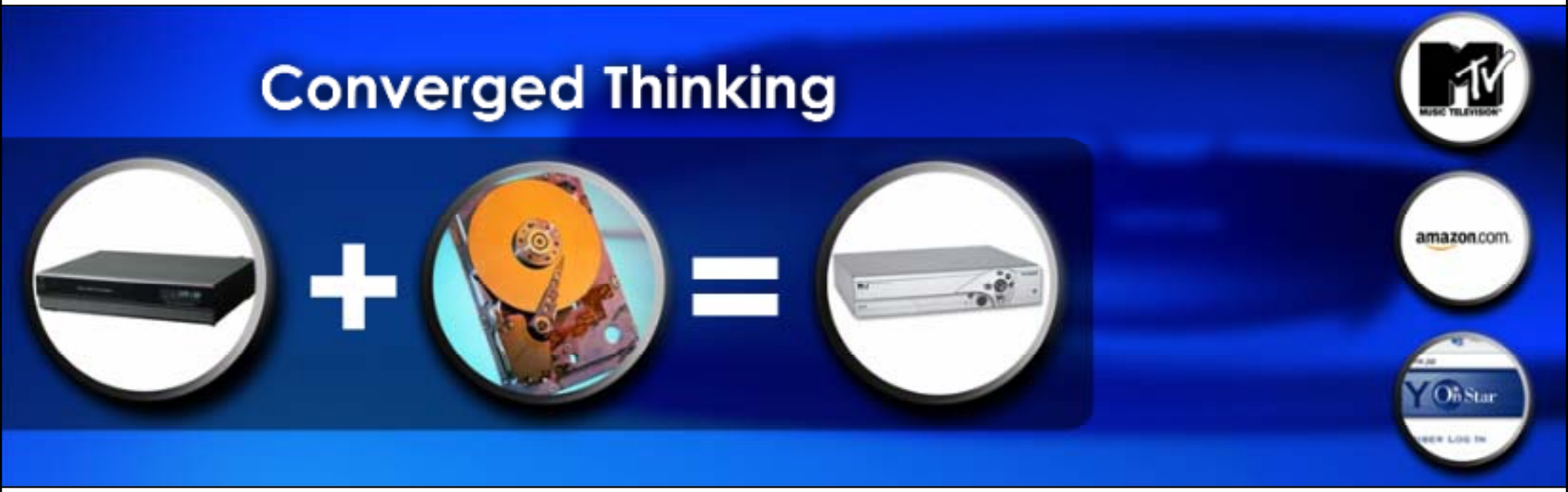


Converged Thinking

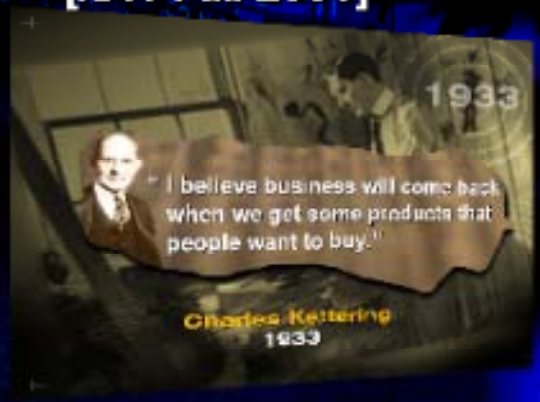


Converged Thinking




Converged Thinking
MTV
MUSIC TELEVISION
amazon.com
OnStar

[IDF: Fall 2001]



[IDF: Fall 2001]

Your Opportunity

- Take advantage of the Raw MIPS
- Innovate around increasing parallelism
 - Thread your applications, drivers, OS…
- Utilize new low power architectures to create breakthrough products
- Address the single largest growth opportunity
 - Win the Enterprise with Itanium Processor Family

[IDF: Fall 2001]



[IDF: Fall 2003 Focus]

Accelerate Convergence: Design for "T's"

Deliver Enterprise Solutions for a "Mobile" workforce

Embrace Standards for a pervasive Digital Home

Design & Market for a global customer base


[converge]